2008 XP for Biased Electrodes

S.J. Zweben, R.J. Maqueda, L. Roquemore,
R.J. Marsala, Y. Raitses, R. Kaita, C. Bush

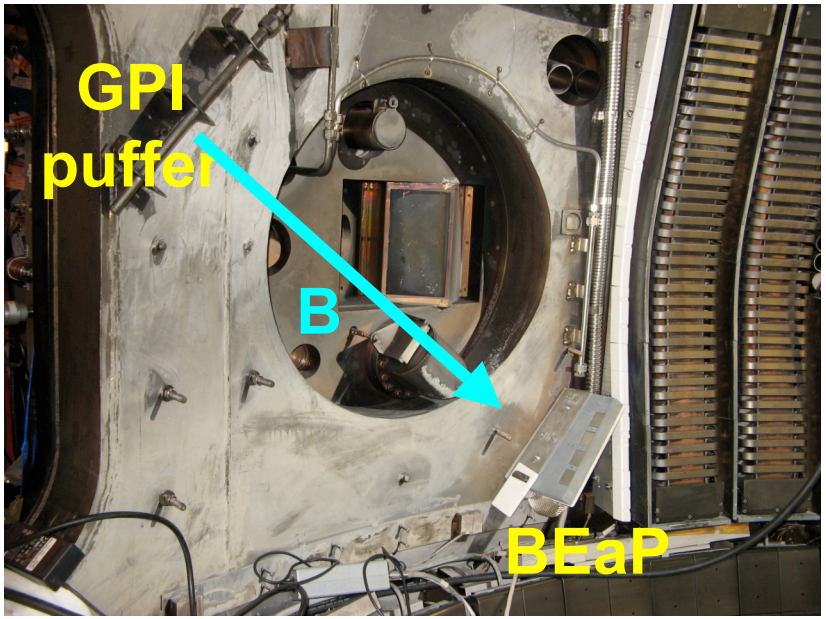
R.H. Cohen, D.D. Ryutov, M. Umansky (LLNL)

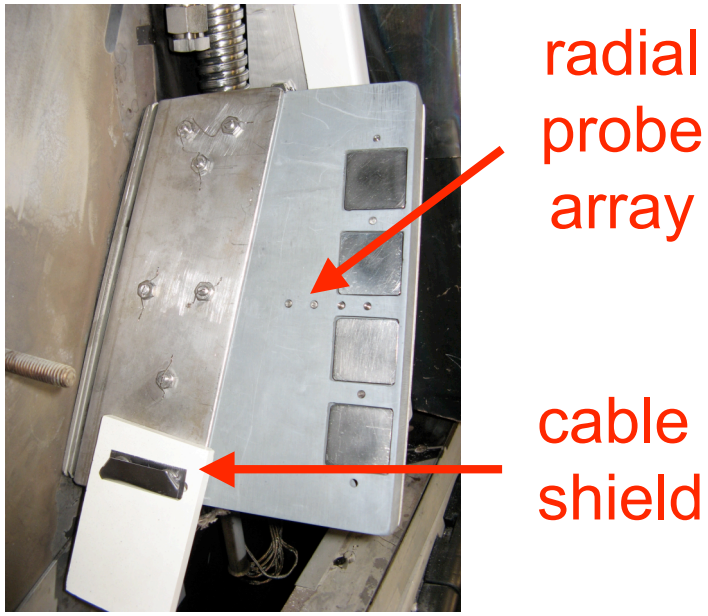
- Upgrades for 2008
- Physics goals for 2008
- Proposal for 2008
- Possible concerns

Boundary XP review 1/8/08

Hardware Upgrades for 2008

- Two positive supplies increased from ~10 A to ~30 A
- Added radial array of probes to measure local SOL
- Will now have fast camera views of BEaP electrodes





BEaP Physics Goals for 2008

- Measure effect of increased positive bias (x3 I, x2 V)
- Measure effect on local SOL with new radial probe array
- View effects of biasing on D_α light near BEaP electrodes
- Evaluate effect of double-probe biasing (floating electrodes)
- Evaluate biasing during RF, including H-mode and ELMs
  (probably *via* piggy-backing)

BEaP XP for 2008 (~1/2 day)

- All like XP#744, I=0.8 MA, B=4.5 T, outer gap ~5 cm -> 1 cm
  perhaps low power NBI early in shot ? (at ≥ 5 cm gap)

#1-5: single-electrode voltage scan +20 V to +100 V (≤ 30 A)
monitor local array, local D_α light at BEaP, GPI images
look for global effects on plasma (impurities, radiation)
after this, check probe-GPI correlations for alignment

#6-10: optimize alignment based on shots #1-5 (i.e. adjust I_p)
try three-electrode biasing, either +/-/+ or -/+/-

#11-15: reconfigure for double-probe biasing (expect ≤ few A)

#16-20: try best biasing configuration at maximum voltages

Possible Concerns

- Electrode heating: P(2008) ≤ 3 kW @ 50% for 0.2 sec
  => maximum ΔT (surface) ~ 75 ºC during shot
  => maximum ΔT (bulk) ≤ 40 ºC after shot
  => should be no problem with melting

- Arcing: will look at electrode currents and fast camera

- Impurity influx: will monitor iron with SPRED and Ptot with bolometer
  no increase in Ptot in 2007 run

- Floating double-probe operation with disruption ? (needs peer review before implementation)